KROHNE

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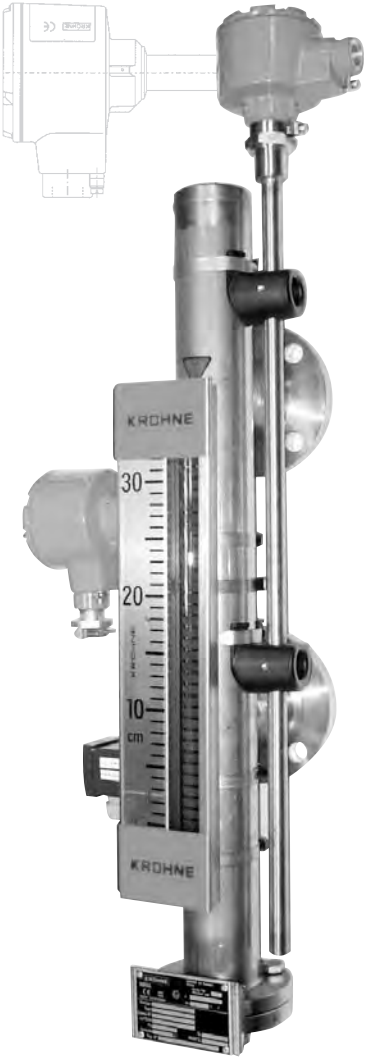
KSAS

Installation and operating instructions

Bypass Level Indicator

BM 26 A

For level or interface measurement of liquids



Contents

General advice on safety

This manual gives a complete set of instructions for the installation, operation and maintenance of the ATEX version of the BM 26 A Bypass Level Indicator.

This instrument is designed to function at near constant pressure conditions.

The instrument must be installed and used by suitably qualified personnel.

Our conformity declaration is limited to the parts of the level indicator that are under pressure, excluding parts that may be dismantled (e.g. valves).

Events that are not taken into account in the calculations include: exceptional risks such as earthquakes, bad weather, acts of destruction (such as sabotage, terrorism, vandalism, etc.) and fire.

WARNING

Special measures must be taken when using titanium floats in order to avoid friction between the titanium and stainless steel causing sparks in an inflammable gaseous environment.

The standard design calculation does not take into account the theoretical coefficient of corrosion. The product circulating in the vessel must not have properties that give rise to surface erosion.

Ex-approved devices: If the device has the appropriate options, then special regulations are applicable to the use of equipment in hazardous locations. These regulations are described in this booklet. For more data, refer to the Ex certificate supplied with the device.

Description: BM 26 A bypass level indicator with magnetic flaps or bar scale

The BM 26 A bypass level indicator is used for measuring level, interface or volume in open or pressurized tanks. It is mounted adjacent to the tank and uses the principle of communicating vessels – the liquid level in the measuring tube corresponds to the liquid level in the tank. Due to its design, the unit is suitable for use in connection with corrosive, toxic or flammable substances and in severe service conditions.

The local indicator consists of:-

- A bar indicator (follower magnet) in a Pyrex glass tube as standard
- or a flap indicator (yellow/black magnetic flaps) in a Pyrex glass tube.

No power is required for local liquid-level indication.
Optionally, the unit can be equipped or retrofitted with an electrical analogue level transducer system and/or limit switches.

Use in hazardous areas
The BM 26 A bypass level indicator is approved for use in explosive atmospheres when equipped with the appropriate options. It is imperative that the approval certificate details and boundary conditions are observed.

Documentation symbols

CAUTION
Information that, if not followed, may lead to actions resulting in incorrect functioning of the device.

WARNING
Information that, if not followed, may lead to actions resulting in measurement error, personal injury and/or damage to the device.

Information and instructions for Ex applications
Information that must be used to observe the safety requirements for installation, operation and maintenance in hazardous areas. If instructions are not followed, this may result in personal injury, damage to the device and/or incorrect functioning of the device.

Handling

WARNING
The device normally weighs from 14.5 kg or 32 lb to 40 kg or 88 lb. Carry the device using at least two people, lifting it by the process connections. Lifting gear may also be used but no attempt should be made to lift the device by the measuring scale, level transducer or other attached equipment.

Product liability and warranty

The BM 26 A bypass level indicator is designed exclusively for liquid-level, liquid/liquid interface or volume measurement, depending on the scale and float selected by the customer.
Special codes and regulations apply to its use in hazardous areas.
Responsibility as to suitability and intended use of this bypass level indicator rests solely with the operator.
Improper installation and operation of these bypass level indicators may lead to loss of warranty.
In addition, the “General conditions of sale” forming the basis of the purchase contract are applicable.
If the bypass level indicator needs to be returned to KROHNE, please read and follow the instructions given at the end of this manual.

Items supplied

- BM 26 A bypass level indicator option: with or without current output or limit switches
- These installation and operating instructions
- Approval documents / certificates of conformity (for hazardous duty only)

Supplied without mounting accessories (stud bolts, flange gaskets and wiring to be provided by customer).

Special certificates (Optional: supplied on customer demand only)

- Test certificate to EN 10204: pressure test, dye penetration test, radiographic test, leak-tightness test, ultrasonic test, helium leak test, surface cleanness and material

Standards / Approvals

In compliance with European Directive 2014/34/EU, the bypass level indicators described in these instructions conform to European Standards EN 13463-1, EN 50014 +1 +2, EN 50018, EN 50020 and EN 50284 and are certified for use in hazardous locations by the INERIS certification agency under INERIS 02ATEX0088X when equipped with the appropriate options.

WARNING
The details given in this approval certificate together with its boundary conditions must be observed.

This instrument also conforms to the European Union Pressure Equipment Directive (PED) 2014/68/EU.

Ex Safety Instructions

ATEX-certified BM 26 A level indicators can be used in explosive atmospheres of all flammable substances in Gas Group IIC (with the exception of cases given in these instructions) and applications requiring Category 1/2 G and 1G equipment. The instrument must be installed and used by suitably qualified personnel.

Ex Equipment Category Definitions

Category 1/2 G – instruments
(for applications where the Ex d-rated explosion-proof box is used)
The signal converter for current output and limit switch options are located in hazardous areas requiring instruments qualified as being category 2. The process connection and tank wall form an interface between zones for category 1 and 2 equipment. The indicator measuring elements (float and measuring tube) are qualified as being category 1. The G rating means that the instrument is qualified for gas environments.

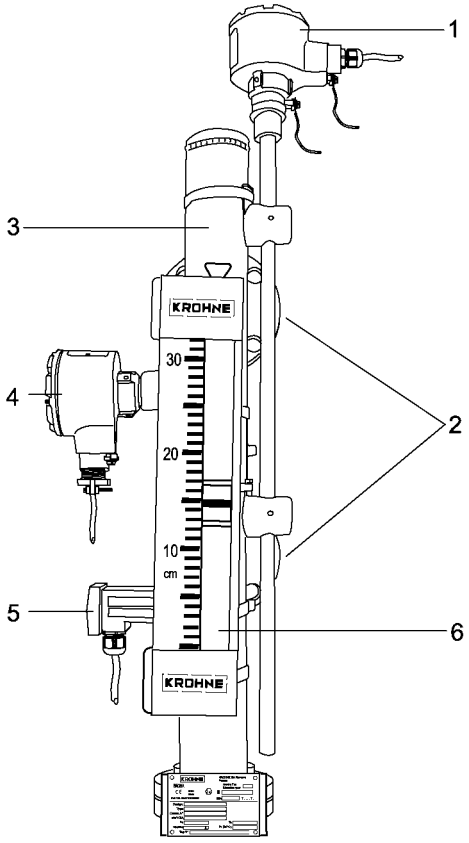
Category 1 G - instruments
The signal converter for current output, limit switch options and measuring components are located in hazardous areas requiring instruments qualified as being category 1.

Official approvals and certificates

Application	Approved by	Instrument version	Certification mark
ATEX certification	INERIS	BM 26 A	Certificate no. INERIS 02ATEX0088X*

*This EC-type Examination Certificate is available on KROHNE's download centre webpage on http://www.krohne.com.

Principal gauge components



1 Level transducer (cable gland not supplied)

2 Process connections

3 Measuring tube (bypass chamber) containing float loaded with magnets

4 MS 15 /EXD limit switch (cable gland not supplied)

5 MS 15 /STD or /EXI limit switch

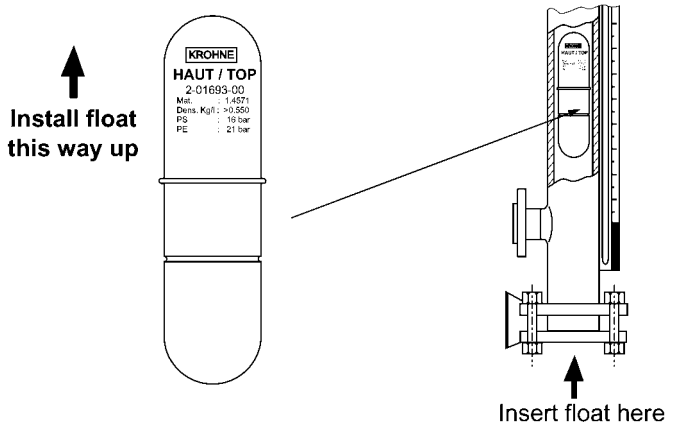
6 Scale clamped adjacent to measuring tube integrating a Pyrex tube with float-following indicator bar.

1 Installation

1.1 Packing and storage

Floats packed separately

1 To install, remove the bottom flange and insert the float – the right way up – into the guide chamber.
2 Align gaskets.
3 Tighten nuts using the correct torque with regards to the strength of bolts specified for the vessel pressure rating, connecting flange and material.



CAUTION

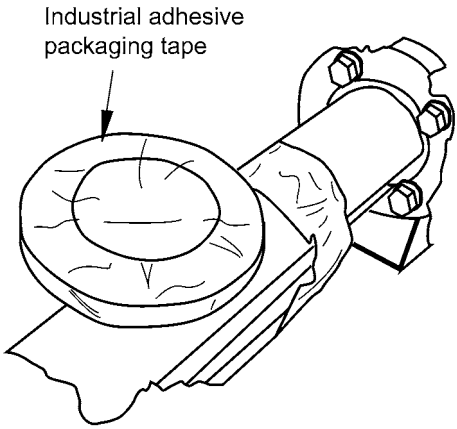
Make sure that the guide tube is free of foreign bodies (dirt, loose objects, etc.).

Floats held in position during transit by a plastic locking clip
This should be removed from the guide tube before installation through the bottom connection flange. Follow the procedure below:

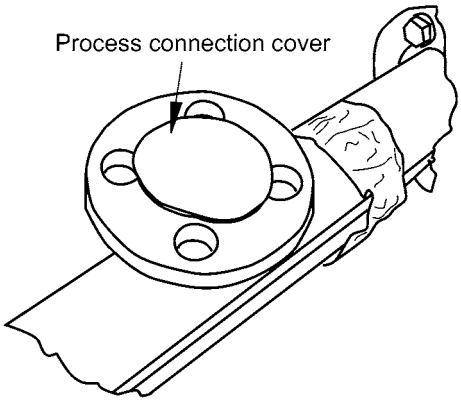
Step 1 Check measuring tube for a red sticker next to the bottom process connection.

ATTENTION!
Retirer la tige de sécurité
maintenant le flotteur
ATTENTION !
Take away transport safety
device for float
ACHTUNG !
Transportsicherung für
Schwimmer entfernen

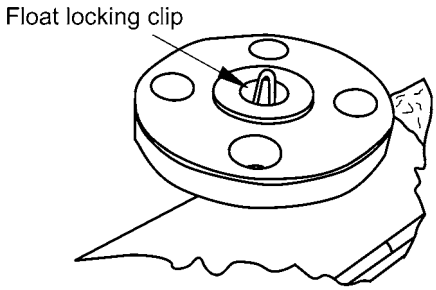
Step 2 Undo adhesive tape around bottom process connection



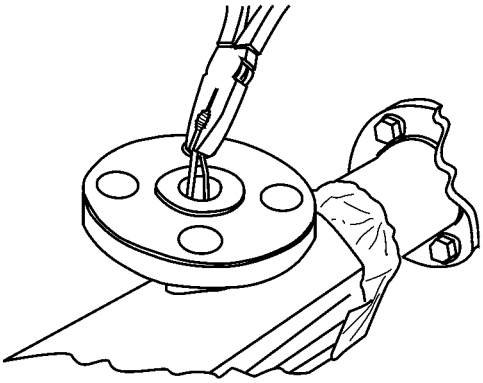
Step 3 Remove process connection plastic protective cover



Step 4 Locate clip

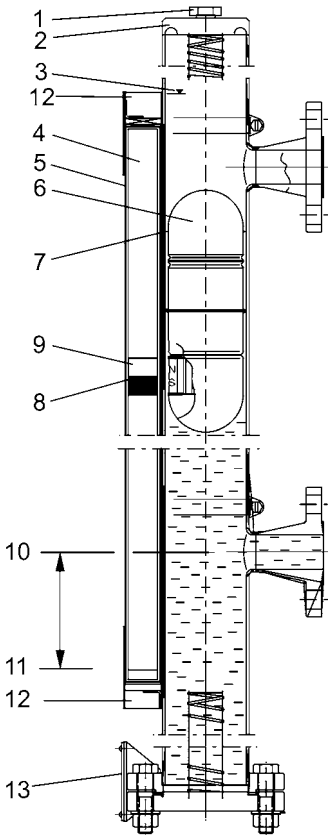


Step 5 Remove clip with a pair of pliers



1.2 BM 26 A construction details

The diagram below shows a standard BM 26 A/C/RR without level transducer and switch options



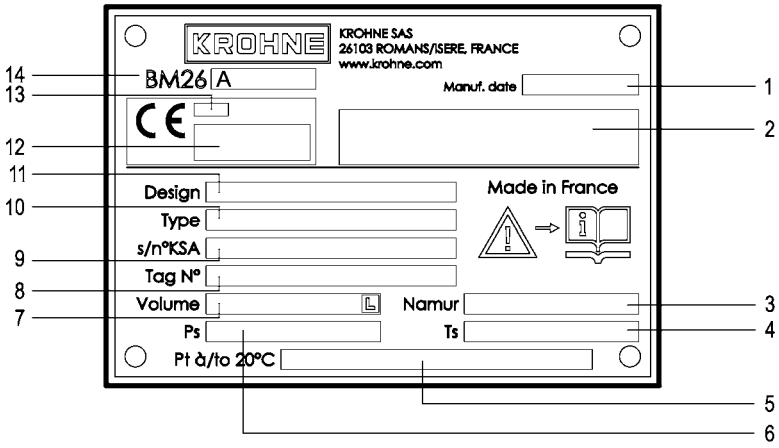
* optional flap indicator available (see section 8)

1	Vent plug
2	Measuring tube
3	Red triangle reference mark giving factory-calculated zero position of measuring scale
4	Glass tube for indicator
5	Scale
6	Float (magnets mounted in lower half)
7	Liquid level
8	Mid-point of indicator
9	Indicator (standard follower bar)**
10	Zero point of measurement (centreline of lower connecting flange)
11	Scale zero
12	Stop (red KROHNE plate)
13	Instrument nameplate

Details:
Item 12 – The red KROHNE plate at the bottom of the scale (item 5) has a label listing the technical characteristics of the float (engineering drawing number, maximum allowable working pressure (PS), test pressure (PE) and float material). For example :

FLOAT:	**F2.09334.00**
PS: 16 BAR	**PE: 21 BAR**
MATERIAL:	**316L**

Item 13 – BM 26 A nameplate



1 Date of manufacture (Year-Month-Day)
2 **Devices with Ex approval only:** Equipment approval category (explosive atmosphere – gas), types of device protection including approved Gas Groups and temperature classes
3 PED marking. Refer to the table that follows for the conditions for each marking (no marking, PED/G1/III, PED/G1/IV or PED/G2/III). This marking agrees with NAMUR Recommendation NE 080.
4 Maximum allowable working temperature (Ts)
5 Test pressure (Pt)
6 Maximum allowable working pressure (Ps)
7 Measuring tube volume (litres)
8 Customer tag number
9 Factory serial number
10 Type code (e.g. BM26 A / C / RR / ER / K) *
11 Designation code as given in the options list (VF06…) **
12 **Devices with Ex approval only:** ATEX certification agency code (0344)
13 PED certification agency code (0036 – if there is a PED marking in item 3)
14 Model name and number

* **Item 3 – PED marking:**

Condition		PED marking	PED certification agency code (item 13)
Group 1 fluids	Ps (bar) × Volume (L) ≤ 1000	PED/G1/III	0036
	Ps (bar) × Volume (L) > 1000	PED/G1/IV	0036
	Volume ≤ 1 L and Ps ≤ 200 bar, or Ps (bar) × Volume (L) ≤ 25	—	—
Group 2 fluids	Ps (bar) × Volume (L) ≤ 3000	PED/G2/III	0036

** Type code is defined as:
Product code/Process connections/Material code/Design/Level transducer/Contact/Approval
*** See BM 26 A technical data sheet for a list of standard options and designation codes

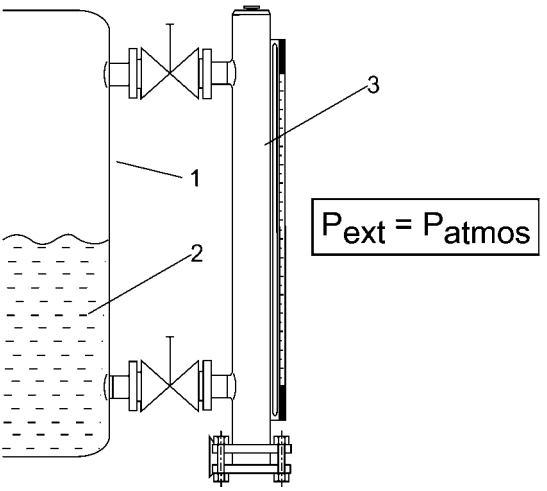
Item 10 – Type code

Type code element	Code	Code definition
Product code	BM 26 A	Bypass Level Indicator (A model)
Process connections	C	Two lateral connections
	D	Two axial connections
	E	One top lateral entry and one bottom axial exit
	F	One bottom lateral entry and one top axial exit
Construction material code	RR	Stainless steel
Design	No info	Standard design
	B	Heater
	AG	Anti-freeze version -40°C / -40°F
	IC/TR	With low temperature insulation
	IC/HR	With high temperature insulation
Level transducer	No info	Without level transducer
	ER	With level transducer
Contact	No info	Without limit switches
	K	With limit switches
Approval	No info	Standard, no approval
	EXI	For EEx – intrinsically safe applications
	EXD	For EEx – flameproof applications

1.3 Mechanical installation requirements

Ensure that the requirements given below have been followed:

- The effective pressure of the installation (the maximum permitted by the pressure limiting valve) must never be greater than the maximum permitted pressure, P_s, marked on the instrument nameplate. The test pressure, P_t, is given on the order documents and BM 26 A nameplate.
- The user must be sure that materials in contact (guide tube, float, gaskets, etc.) with the fluid used are compatible with the fluid and conform to ageing characteristics of the fluid used and the measurement environment. These have either been recommended in the instructions or form the subject of a particular specification in the contract.
- The external pressure (P_{ext}) must be equal to atmospheric pressure(P_{atmos}).



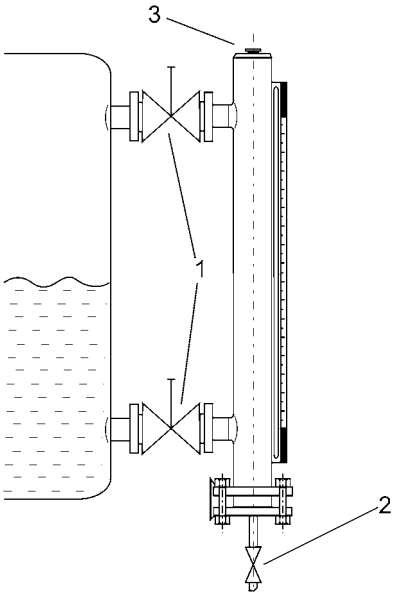
1 Tank

2 Liquid product

3 BM 26A level-liquid indicator (measuring tube):
Vertical installation only!

1.4 Mounting on the tank

- The BM 26 A bypass level indicator must be installed vertically on the tank
- When installing the BM 26 A bypass level indicator with or without the electrical level transducer system, make sure that any magnetic fields generated by other equipment will not affect measurements.
- Select bolts and gaskets (supplied by customer) that correspond to the pressure rating of the connecting flange and the operating pressure.
- The process connections (flanges) must fit perfectly, i.e. they must be centred, parallel and bolted in a professional way, in order to avoid unnecessary mechanical stress on the installation.
- The tank must be free of contaminants. It is recommended to install shut-off elements, e.g. cocks, valves, etc., between the tank and bypass level indicator to allow the bypass level indicator to be cleaned independently of the tank. The drain plug in the bottom flange must also be replaced by a drainage cock with discharge line.

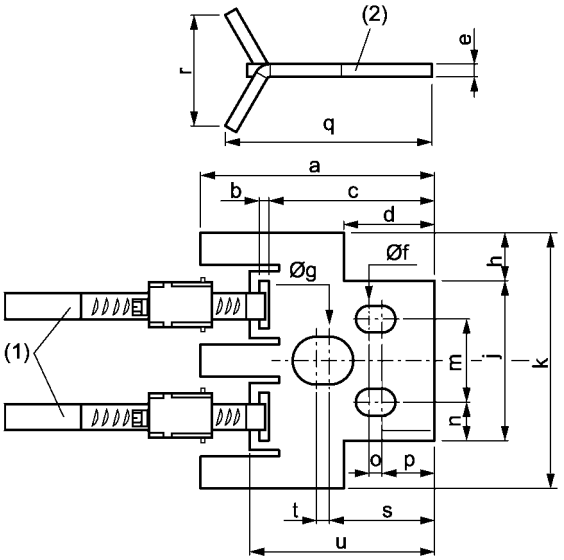


1 Shut-off valve (top and bottom)

2 Drainage valve with discharge tube.

3 Vent plug

- Additional anchoring points between the BM 26 A and the tank are recommended for very high installations (above 6 metres length for stainless steel). The standard anchor is a set of collars attached to a plate. This is available on demand from KROHNE. See figure below for side and plan view and dimensions in millimetres and inches.



(1) Chamber collar (2 collars)
(2) Plate for bolting to the tank

Dimensions	[mm]	[inches]
a	73	2.87
b	3	0.12
c	52	2.05
d	28.5	1.12
e	4	0.16
Øf	8.4	0.33
Øg	15	0.59
h	15	0.59
j	50	1.97
k	80	3.15
m	26	1.02
n	12	0.47
o	4	0.16
p	16.5	0.65
q	64.85	2.55
r	34.64	1.36
s	33	1.31
t	4	0.16
u	58	2.28

1.5 Start-up procedure

WARNING
Take the necessary safety precautions when working with pressurized tanks.

Step	Action
1	Close drainage plugs and/or drainage cock.
2	Open shutoff elements at lower and upper connecting flange.
3	Adjust the position of the local measuring scale so that scale level corresponds exactly to true level, see section 1.6.

WARNING
- The user must take the necessary steps to protect the installed instrument from shock waves (water hammer). A pressure limiting valve must equally protect the installation.
- The instrument must regularly undergo servicing to conform to the rules and regulations applicable to the site that it is installed on.
- High Temperature versions - precautions must be taken to avoid burns to operators.

1.6 True level indication

1.6.1 Level measurement using the local indicator and scale

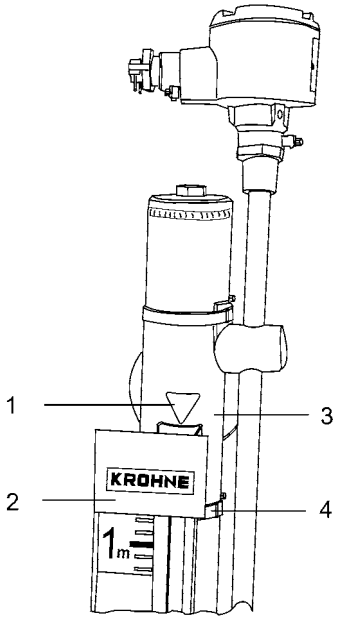
The float is equipped with a ring system of permanent magnets for transmission of liquid level to the indicator. The indicator is linked magnetically to the magnet system in the float.

For design reasons, the minimum level in the measuring tube is given by the lower lateral flange connection axis i.e. liquid level zero is the centreline of the lower connecting flange. As can be seen in the diagram of the float and indicator in section 1.2, the bar follows the float below the liquid level.

There is a difference between true liquid level and the indicator position because:
- the float is immersed to a certain depth depending on the product density and float type,
- the float magnets are positioned below the float centreline in order for the float to have good stability.

The scale is delivered correctly set up for measuring the product specified in the order. The red reference mark at the top of the measuring tube (item 1 in the diagram below) shows where the top of the scale must be clamped for the indicator to give an accurate reading of liquid level. No further adjustment is necessary when the gauge is commissioned.

Note
If there is a large change in product density, a product other than the one specified in the order is measured or a different float is installed, the scale on the BM 26 A may require adjusting to give an accurate reading. Contact KROHNE for assistance (see also section 1.6.4 to correct the scale's position).



1 Reference mark : the top of the upper red KROHNE plate must touch the bottom point of the triangle

2 Scale

3 Measuring tube (containing float)

4 Top clamping collar (scale-measuring tube)

1.6.2 Floats

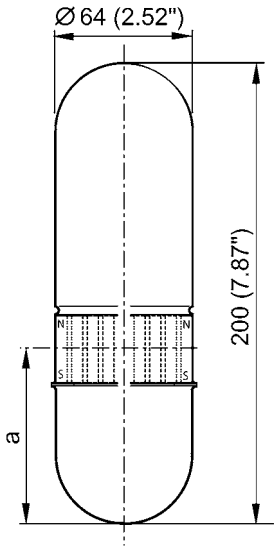
Four float types are used for liquid level measurement.

- Floats 1 and 2 are made of either 316L or 316Ti (as ordered).
- Floats 3 and 4 are made of titanium

The float number identifies the wall thickness of the float and the material used.

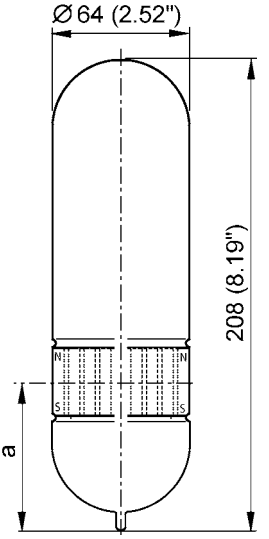
The dimension “a” in the diagrams below gives the distance from the base of the float to the centre line of the integrated magnet system. This should be used in calculations for adjustments to the measuring scale caused by differences between true liquid-level zero and indicated scale zero (see section 1.6.4).

316L or 316Ti floats-No.1 and 2



where a = 47 mm or 1.85“
and :
Float No.1 wall thickness = 1 mm or 0.04”
Float No.2 wall thickness = 0.5 mm or 0.02”

Titanium floats-No. 3 and 4



where a = 48 mm or 1.89“
and :
Float No.3 wall thickness = 0.6 mm or 0.024”
Float No.4 wall thickness = 1 mm or 0.04”

Dimensions in mm (inches)

Note
Minor variants of the above exist for particular applications: very low density products, interface measurement applications and so on. Contact KROHNE for further information.

Density and operating temperature limits

Float type	Density and operating temperature limits					
No.	Min. density of product		Product temperature			
			Min.		Max.	
	[kg/l]	[lb/ft³]	[°C]	[°F]	[°C]	[°F]
BM 26 A / Standard versions without approvals						
1	0.82	51.19	-200	-325	+300	+570
2	0.55	34.34	-200	-325	+300	+570
3	0.50	31.21	-200	-325	+300	+570
4	0.60	37.46	-200	-325	+300	+570
Instruments or approved for use in Ex hazardous zones						
BM 26 A / ATEX (local indicator with electrical equipment)						
1	0.82	51.19	-40	-40	+70…+195*	+160…+380*
2	0.55	34.34	-40	-40	+70…+195*	+160…+380*
3	0.50	31.21	-40	-40	+70…+195*	+160…+380*
4	0.60	37.46	-40	-40	+70…+195*	+160…+380*

* The product temperature depends on the BM 26 A ATEX temperature class (T3 … T6). See section 7.1 for further information.

Operating pressure limits

Float type BM 26 A	Operating pressure limits of the float							
No.	Max. allowable operating pressure							
	At +20°C / +70°F		At +100°C /+210°F		At +200°C / +390°F		At +300°C / +570°F	
	[barg]	[psig]	[barg]	[psig]	[barg]	[psig]	[barg]	[psig]
Standard versions without approvals								
1	55	800	41	600	37	535	32	465
2	23	335	12	175	10	145	9	130
3	23	335	13	190	10	145	8	115
4	55	800	31	450	24	350	19	275
Instruments approved for use in Zone 0 BM 26 A/ATEX (local indicator with electrical equipment)								
1	55	800	41	600	–	–	–	–
2	23	335	12	175	–	–	–	–
3	23	335	13	190	–	–	–	–
4	55	800	31	450	–	–	–	–

Important note
Float test pressure is tested according to pressure equipment directive 2014/68/EU and official approvals.

1.6.3 Changing the process conditions

If the user wishes to use the BM 26 A to measure another product, then the following points should be noted:

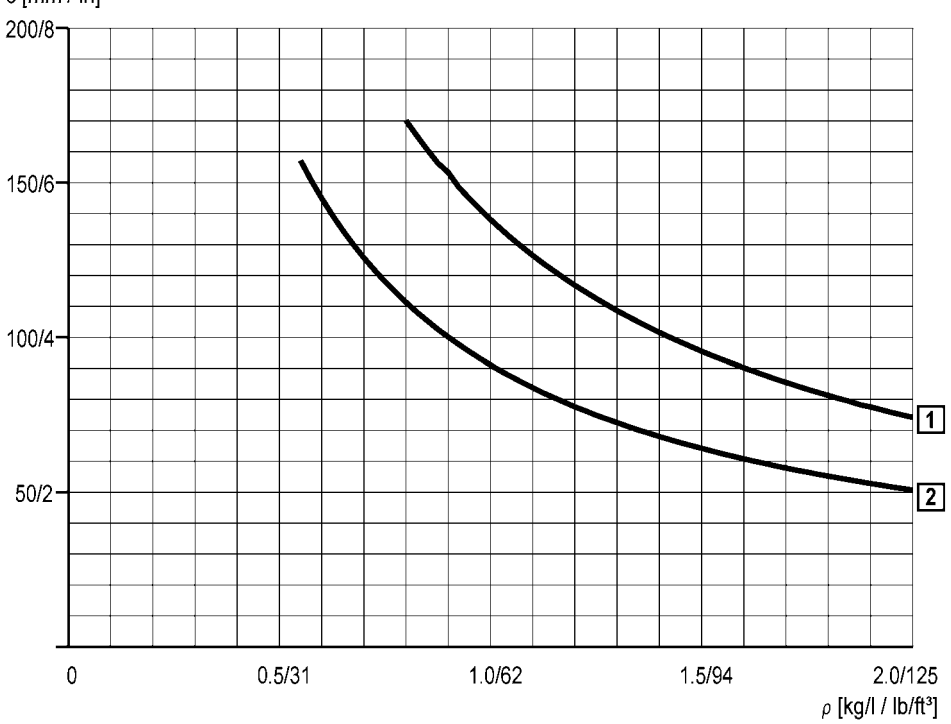
- Contact KROHNE for advice and information on equipment / product compatibility especially where use in hazardous areas is concerned.

- Ensure that Pressure Equipment Directive 2014/68/EU is observed, if relevant.

- The depth of immersion “c” (see section 1.6.4) of the float increases as product density decreases. This depth is also dependent on the float model (No. 1, 2 ,3 or 4) and material used (316L, 316Ti or titanium). The new depth of immersion “c” is shown on the two line graphs below. Further information is available from KROHNE on request to accurately calibrate your instrument. When contacting KROHNE remember to:
  - quote KROHNE references (order / fabrication no.) for the BM 26 A in question
  - identify the new product and give its density at the new operating conditions.
  - give information about the old application. Floats may have been especially adapted for specific applications; for example: density- adjusted (pressurized) or floats for low density applications and floats with ballast for interface measurement.

- The top of the float must be no more than 35 mm or 1.38” above the product surface to ensure reliable floatability and accurate measurement.

Graph 1: Float immersion depth against product density
Line 1 : Float no. 1 made of 316Ti (1.4571) or 316L (1.4404), wall thickness 1 mm or 0.04”
Line 2 : Float no. 2 made of 316Ti (1.4571) or 316L (1.4404), wall thickness 0.6 mm or 0.02”

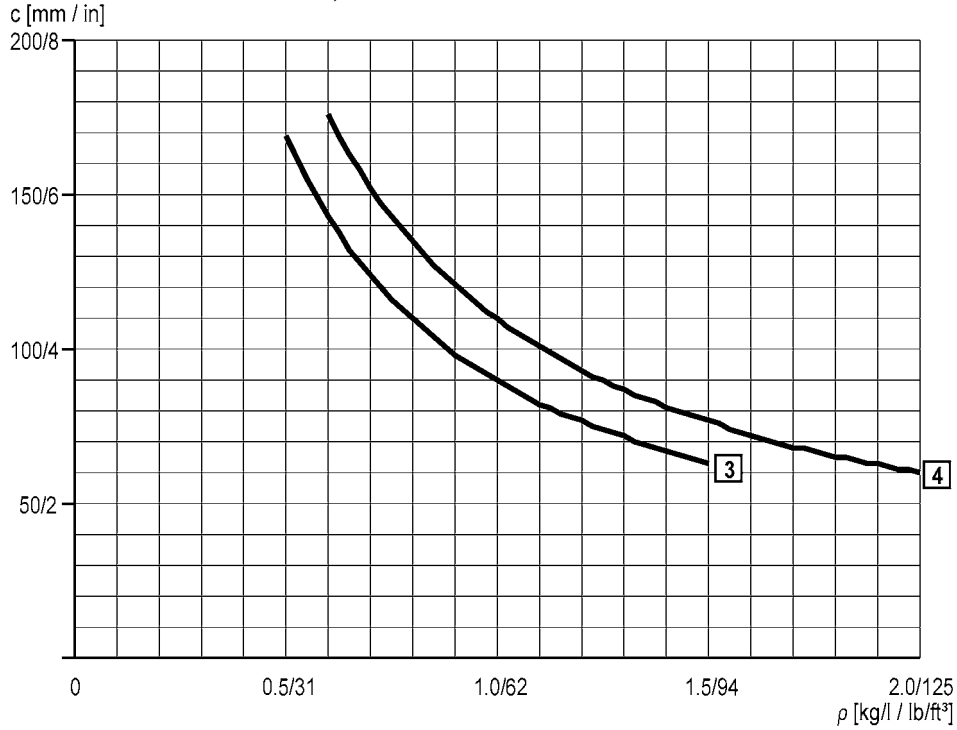


Where c is immersion depth and ρ is product density

Graph 2: Float immersion depth against product density

Line 3 : Float no. 3 made of titanium, wall thickness 0.6 mm or 0.024”

Line 4 : Float no. 4 made of titanium, wall thickness 1 mm or 0.04”



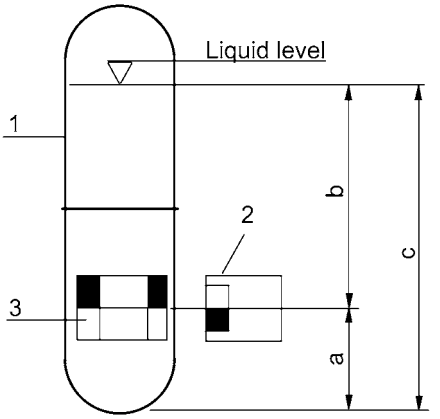
Where c is immersion depth and ρ is product density

1.6.4 Correcting the scale position to accurately read true liquid level

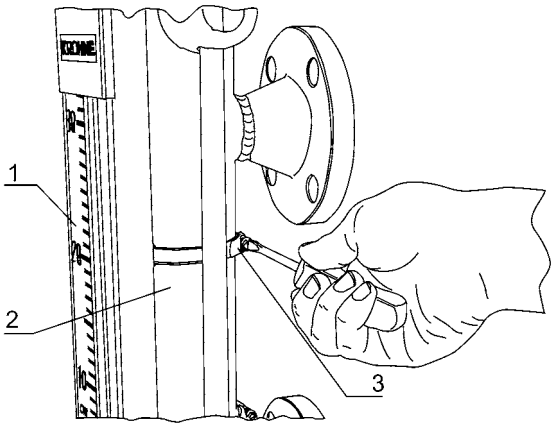
The scale* can be corrected by the customer using the following procedure:

Step	Action
1	Find the float immersion depth “c” (supplied by KROHNE, refer also to section 1.6.3).
2	Subtract the dimension “a”, float base to magnet centreline (given on the float dimensioned drawing in Section 1.6.2), from “c” to get the dimension “b”, scale correction factor.

Item	Description
b =	c – a (difference between liquid level and indicator position due to product density)
c =	float immersion depth (a function of product density), see section 1.6.3.
a =	distance from centerline of magnet system to the float base, see dimensioned float drawings in section 1.6.2.
1 =	Float
2 =	Follower magnet of indicator (or limit switch)
3 =	Position of magnets mounted in the float



3	Loosen the two clamp collars holding the measuring scale onto the measuring tube using a screwdriver or 8 mm wrench.
4	Bring the zero point (top of the lower red KROHNE plate) on the scale into line with the centreline of the bottom lateral process connection.
4a	Undo top collar



1 Measuring scale

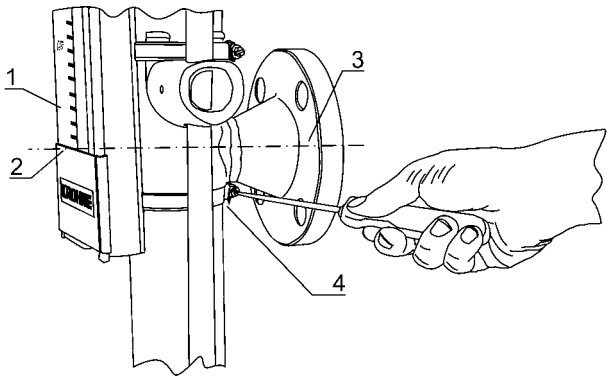
2 Measuring tube

3 Top measuring scale collar

*This information also applies to the initial setting up of limit switches – however, the fitter should also remember to take into account the limit switches offset trigger point (see section 3.6).

4b Undo bottom collar

4c Zero the scale (default)



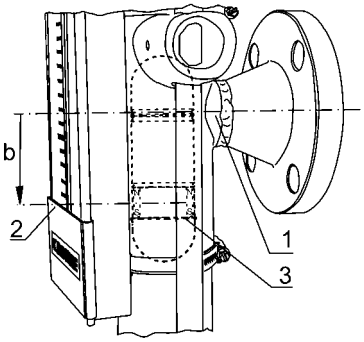
1 Measuring scale

2 Bottom of scale (item 1) indicated by top of red KROHNE plate. Default position is on the same level as item 3.

3 Centreline of bottom lateral process connection.

4 Bottom measuring scale clamp

5 Move the measuring scale down the measuring tube to set to by “b” mm.



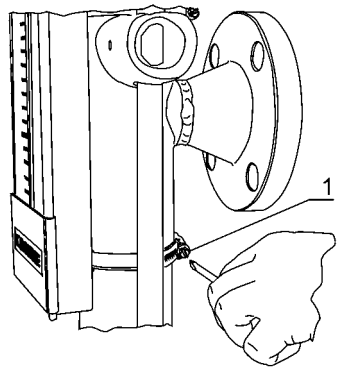
1 Centreline of bottom lateral process connection.

2 Bottom of scale (item 1) indicated by top of red KROHNE plate.

3 Position of float (dashed lines) when measuring tube filled up to the centre line of bottom lateral process connection.

B Move scale down measuring tube by “b” mm. The bottom of the scale will then be at the same level as the magnets in the float

6 Retighten the two collars holding the measuring scale onto the measuring tube.



1 Measuring scale collar screw

1.6.5 Functional check of local level display (bar indicator only)

Step	Action	Comments
1	Break the magnetic bond between the float and the indicator bar using a bar magnet.	The indicator bar (9*) will drop down and disappear behind the red cover (12*) on the front scale.
2	Retrieve the indicator the bottom of the tube with a bar magnet. Lift up the tube.	The indicator will again magnetically bond with the float at the correct indicated value.
3	End of the procedure.	If the indicator bar fails to bond magnetically, please contact KROHNE for assistance.

*See diagram in section 1.2.

2 Level transducer

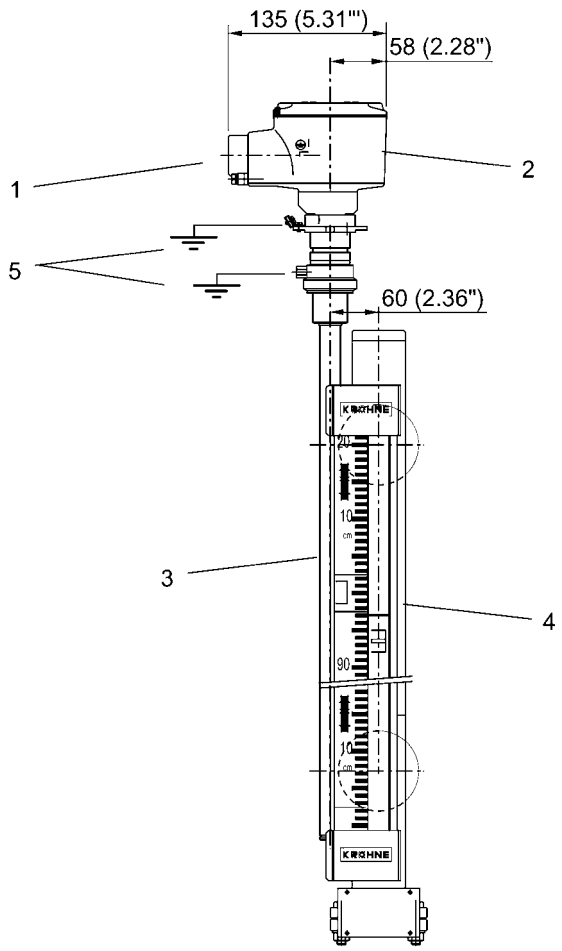
2.1 General notes

In addition to the local scale indicator, the BM 26 A can be fitted with a level transducer that transmits a magnetically-actuated 4 to 20 mA analogue current output for monitoring level outside a hazardous zone.

This type of indication uses a stainless steel tube containing a resistive reed contact chain that is clamped adjacent to the measuring tube. The position of the float magnet in the measuring tube determines the output. This output is calibrated at the factory and does not require any further adjustment when the BM 26 A is commissioned.

The transducer reading is converted into a current output of 4 to 20 mA by the transmitter that is potted into the transducer housing. The transmitter module used is detailed in the following sub-section (detailed technical data is given in section 7.2). The intrinsically safe transmitter may be used with or without a galvanically-isolated 4 to 20 mA output for the BM 26 A EEx ia version.

BM 26 A Std / EEx I / EEx d with level transducer (aluminium transmitter housing)



1 Cable entry.
Only Ex i or Ex d-certified components and cable glands to be connected!
With M20 × 1.5 thread.
Optional: M25 × 1.5
NPT ¾

2 Level transducer housing

3 Stainless steel tube-encased reed chain

4 BM 26 A measuring tube and scale with magnetic following level-indicator

5 PE Ground terminals.
Both terminals must be connected to Ground!

Dimensions in mm and (inches)

2.2 Transmitters

The BM 26 A can be equipped with a level transducer. The level transducer is defined by the type of communication used (ER – electronic remote), housing protection (Ex d, Ex I etc.), housing material (AL – aluminium) and transmitter module.

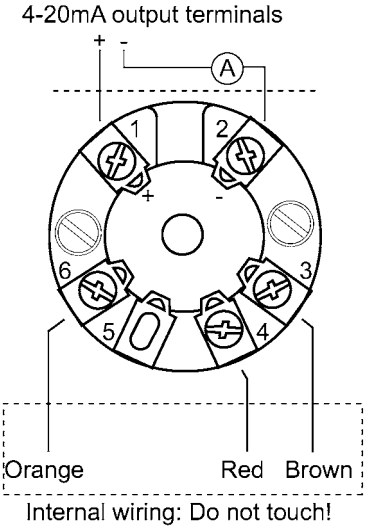
2.2.1 Transmitter versions for the BM 26 A

Version designation	Housing protection	Transmitter module
ER/STD/AL/D	Without (non-Ex)	D PR 5343B 4-20mA
ER/EXI/AL/D	EXI (EEx ia)	
ER/EXD/AL/D	EXD (EEx d)	
ER/STD/AL/E	Without (non-Ex)	E PR 5350B PROFIBUS PA / FF
ER/EXI/AL/E	EXI (EEx ia)	
ER/EXD/AL/E	EXD (EEx d)	
ER/STD/AL/F	Without (non-Ex)	F PR 5335D 4-20mA+HART
ER/EXI/AL/F	EXI (EEx ia)	
ER/EXD/AL/F	EXD (EEx d)	

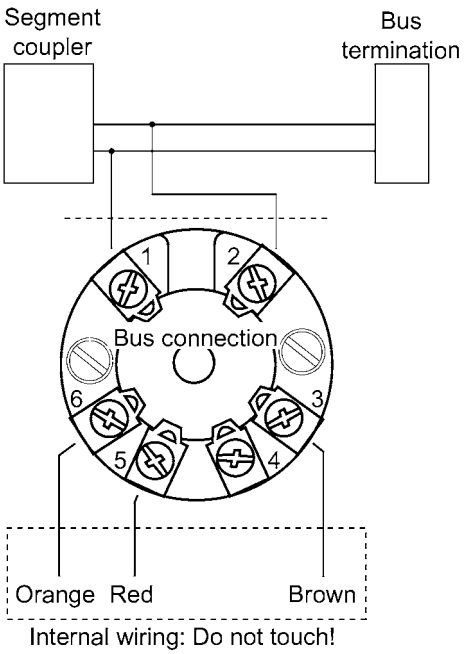
2.2.2 Electrical connections

WARNING
Do not remove the transducer cover until the power supply has been disconnected

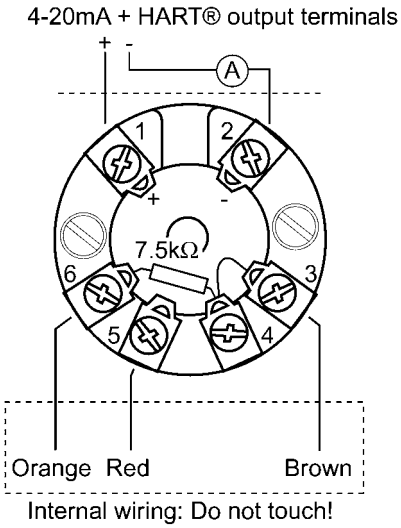
PR 5343B : 4-20mA (top view)



PR 5350B : PROFIBUS PA / FF



PR 5335D : 4-20mA+HART®



WARNING
Refer to section 7.2 for technical information on the use of equipment in hazardous locations.

3 Limit switches / contacts

3.1 General notes

To signal specific liquid levels, the BM 26 A bypass level indicator can be equipped with limit switches that are clamped to the measuring tube and are adjustable over the whole measuring range. They are actuated by a magnet incorporated into the float. The operating conditions define which limit switches may be used. Refer to section 7.3 for detailed technical data on each type of limit switch.

The limit switches are delivered separate from the BM 26 A gauge and have to be mounted on site. See sections 3.5 to 3.6 for installation instructions.

For data about how to install MS 40 limit switches, refer to the MS 40 Addendum for the BM 26 A Bypass Level Indicator.

3.2 Designation code for defining limit switch versions

Housing protection	Cut-out power	Housing material	NAMUR conformity	Process temperature applications
STD (Without)	LC (Low power cut-out)	PC (Polycarbonate / Standard)	NN (Non-NAMUR)	BT (Low temperature)
EXI (EEx ia)	HC (High power cut-out)	AL (Aluminium)	NO (NAMUR)	HT (High temperature)
EXD (EEx d)				

3.3 Limit switch options for the BM 26 A (non-Ex)

Designation	Housing protection	Housing material	Power cut-out	Process temperature		Ambient temperature / °C	Ambient temperature / °F
MS 15/STD/LC/PC/NO/BT	Without	PC	NAMUR	<250°C	<480°F	-20...+120	-5...+245
MS 15/STD/LC/AL/NN/HT	Without	ALU	20 VA 1.5 A 250 VAC	<300°C	<570°F	-20...+120	-5...+245
MS 15/STD/LC/AL/NO/HT	Without	ALU	NAMUR	<300°C	<570°F	-20...+120	-5...+245
MS 15/STD/HC/PC/NN/BT	Without	PC	Max.: 100 VA Min.: 3 VA 1.5 A 250 VAC	<250°C	<480°F	-20...+120	-5...+245
MS 15/STD/HC/AL/NN/HT	Without	ALU	Max.: 100 VA Min.: 3 VA 1.5 A 250 VAC	<300°C	<570°F	-20...+120	-5...+245

3.4 Limit switch options for the BM 26 A (ATEX version)

Designation	Housing protection	Housing material	Power cut-out	Process temperature	Ambient temperature	Power supply characteristics
MS 15/EXI/LC/ PC/NO/BT	EXI*	PC	NAMUR	**	**	U_i 24 V I_i *** C_i 0 L_i 0
MS 15/EXI/ LC/AL/NN/HT	EXI*	ALU	1.5 A*	**	**	U_i **** I_i 500 mA C_i 0 L_i
MS 15/EXI/ LC/AL/NO/HT	EXI*	ALU	NAMUR	**	**	U_i 24 V I_i *** C_i 0 L_i 0
MS 15/EXD/LC/ AL/NN/HT	EXD	ALU	20 VA 1.5 A 250 VAC	**	**	U_{max} 380 VAC I_{max} 1.5 A P_{max} 20 VA
MS 15/EXD/LC/ AL/NO/HT	EXD	ALU	NAMUR	**	**	U_{max} 380 VAC I_{max} 1.5 A P_{max} 20 VA
MS 15/EXD/HC/ AL/NN/HT	EXD	ALU	Max.:***** Min.: 3 VA 1.5 A 250 VAC	**	**	U_{max} 380 VAC I_{max} 1.5 A P_{max} 20 VA

* To be connected to a certified intrinsically-safe power supply only.
** Dependent on ATEX temperature class. Refer to section 7.1 for further information.
*** The current value is not imposed, however the power supply must be intrinsically-safe.
**** The voltage value is not defined, however the power supply must be intrinsically-safe.

3.5 How to use a limit switch

3.5.1 Operating principle

The MS 15/STD, MS 15/EXI and MS 15/EXD limit switches consist of a reed contact that is actuated directly by the magnet system in the float. Due to their bi-stable switching characteristic, the switching state is maintained until the float magnet system again deactivates the limit switch in the opposite direction. Line-side connection of a suitable isolation switching amplifier is recommended.

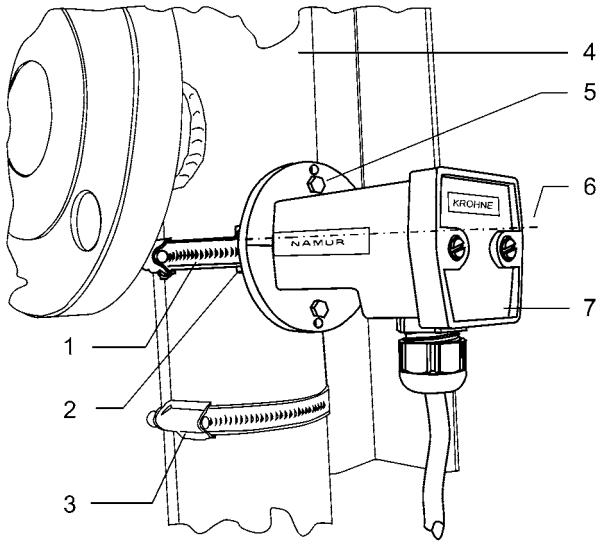
For more data about how to use MS 40 limit switches, refer to the MS 40 Addendum for the BM 26 A Bypass Level Indicator.

3.5.2 Installation

1 Attach the switch to the measuring tube at the desired level using the metal collar supplied.
2 Adjust the switch level to take into account the difference between indicated level and true level (see section 1.6.4).
3 Adjust the switch level to take into account limit switch trigger point offset (see section 3.6.2).

Note: Due to its bi-stable characteristic, the switch can be operated in open-circuit or closed-circuit mode (see section 3.5.5 Electrical connections), when appropriately connected.

Clamping in position on measuring tube
MS 15 /STD/…/PC/…/BT or MS 15/EXI/…/PC/…/BT



1 Limit switch clamp

2 Limit switch bracket

3 Measuring scale clamp

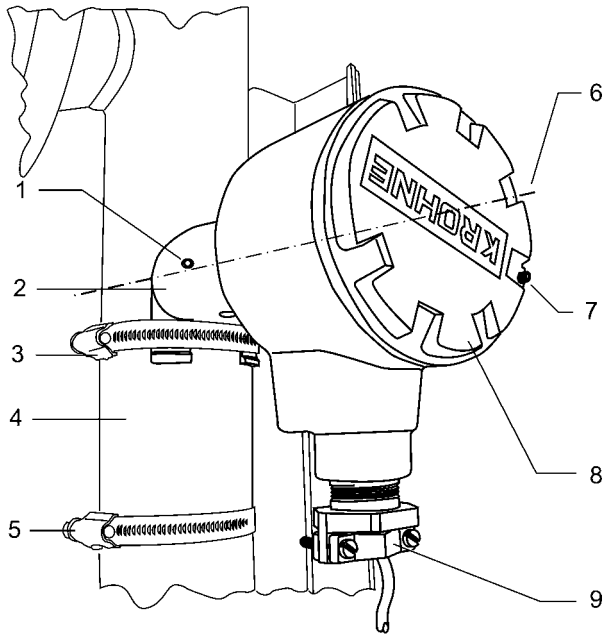
4 Measuring tube

5 2 M4 screws (for bracket)

6 Switching point centerline
Fine adjustment:
See procedure, section 3.6

7 MS 15 /STD or /EXI limit switch cover

MS 15 /STD/…/AL/…/HT, MS 15/EXD/…/AL/…/HT, or MS 15 /EXI/…/AL/…/HT



1 1 × locking screws M6 -use 3 mm Allen key

2 Limit switch bracket

3 Limit switch clamp

4 Measuring tube

5 Measuring scale clamp

6 Switching point centerline
Fine adjustment:
See procedure, section 3.6

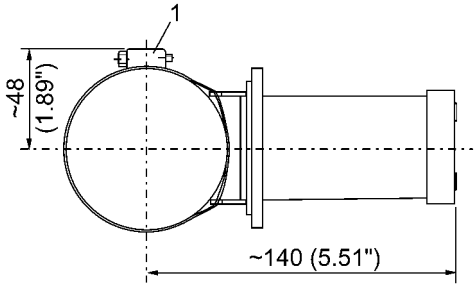
7 Cover lock:
M3 screw -
use 2 mm Allen key

8 MS 15 EXD
limit switch cover

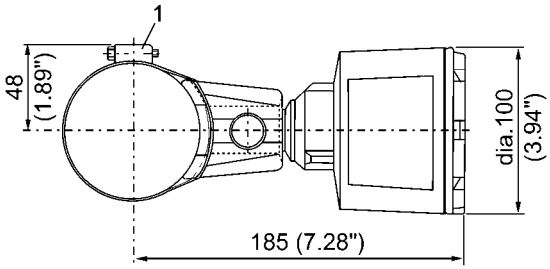
9 Cable fitting (not supplied by KROHNE)

3.5.3 Overall dimensions of limit switches mounted on measuring tube

MS 15 /STD/…/PC/…/BT and
MS 15 /EXI/…/PC/…/BT



MS 15 /STD/…/AL/…/HT,
MS 15 /EXI/…/AL/…/HT, and /EXD/…/AL/…/HT



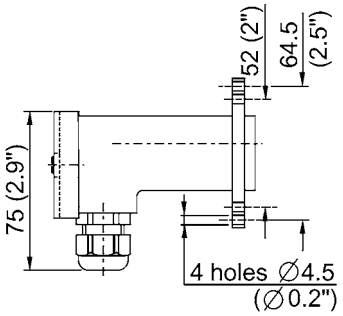
* Item 1: limit switch collar screw

Dimensions in mm (inches)

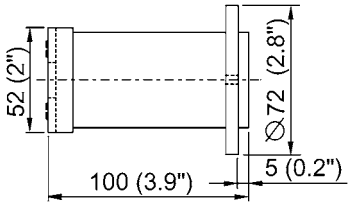
3.5.4 Limit switch dimensions (without bracket and clamp)

MS 15 /STD/…/PC/…/BT
and MS 15 /EXI/STD/…/PC/…/BT
with PG 13.5 cable gland

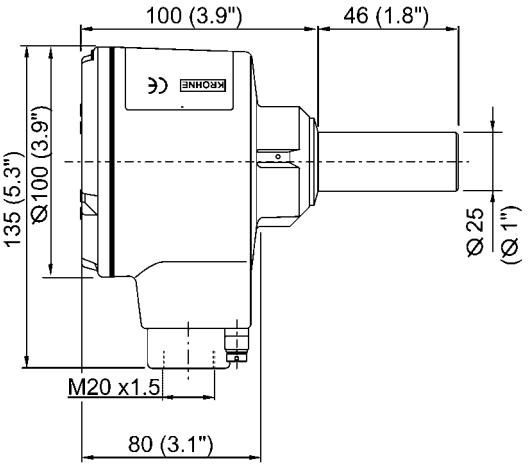
Side view



Top view



MS 15 /STD/…/AL/…/HT,
MS 15 /EXI/…/AL/…/HT,
and MS 15 /EXD/…/AL/…/HT
without cable gland (supplied by customer)
Side view



Dimensions in mm (inches)

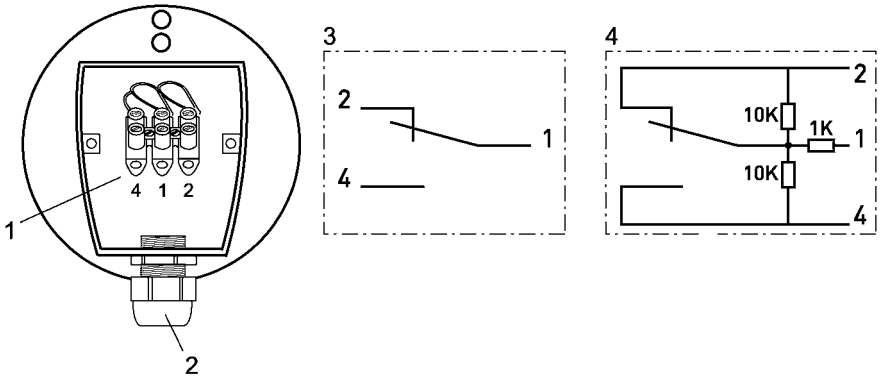
3.5.5 Electrical connections

Unscrew the housing cover at the rear. For further technical data, see Section 7.3. Use connections that are certified for Ex d applications for EXD casings. Wire as shown below:

WARNING
Do not remove the limit switch cover until the power supply has been disconnected.

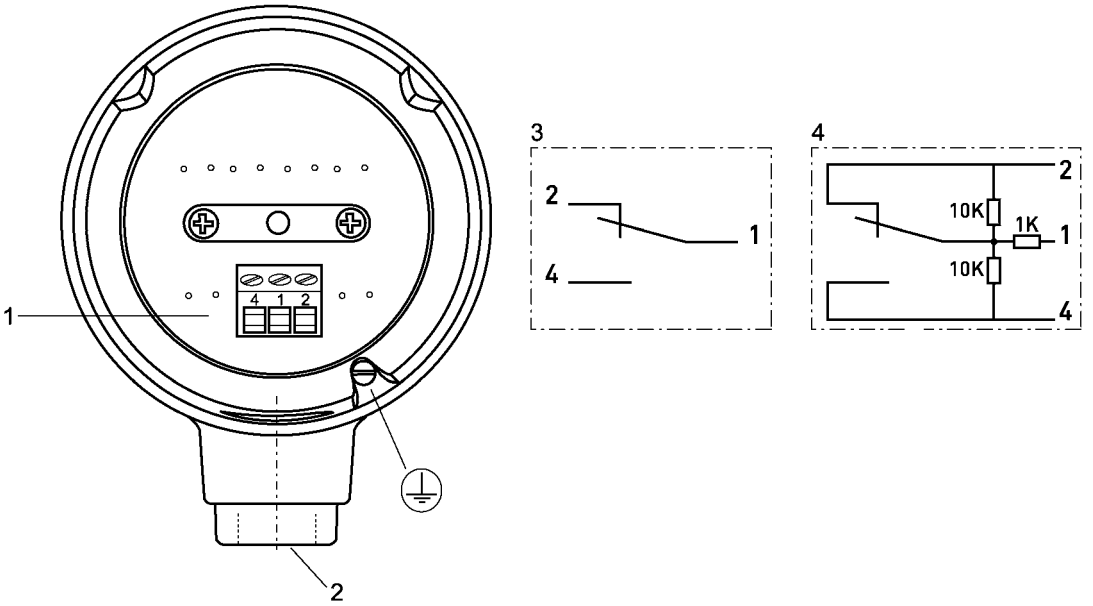
MS 15 limit switches

STD/…/PC/…/BT or EXI/…/PC/…/BT terminals
STD/…/PC/NO/BT or EXI/…/PC/NO/BT (NAMUR) terminals



1 Terminals
2 Cable gland (PG 13.5)
3 Non-NAMUR switch option (wiring diagram)
4 NAMUR switch option (wiring diagram)

STD/…/AL/…/HT, EXI/…AL/…/HT, or EXD/…/AL/…/HT terminals



1 Terminals
2 Hole with M20 × 1.5 thread. Cable gland supplied by customer
3 Non-NAMUR switch option (wiring diagram)
4 NAMUR switch option (wiring diagram)

3.6 Fine adjustments to the limit switch trigger point

3.6.1 General notes

Due to the way the reed switch switches from one state to another and the geometry of magnets integrated into the float, different switching points are obtained when the float moves up or down. This must be taken into account when positioning the limit switch.

The assembler must equally remember that as with the local display, limit switch position must take into account the fact that indicated level is lower than true level.

By default, indicated level is lower than true level by “b” mm. This should be adjusted during commissioning (see section 1.6.4). When the float moves up, the switch is triggered with the float offset by “d” mm. When the float moves down, the switch is triggered with the float offset by “e” mm (see section 3.6.3).

Hysteresis: see section 7.3.

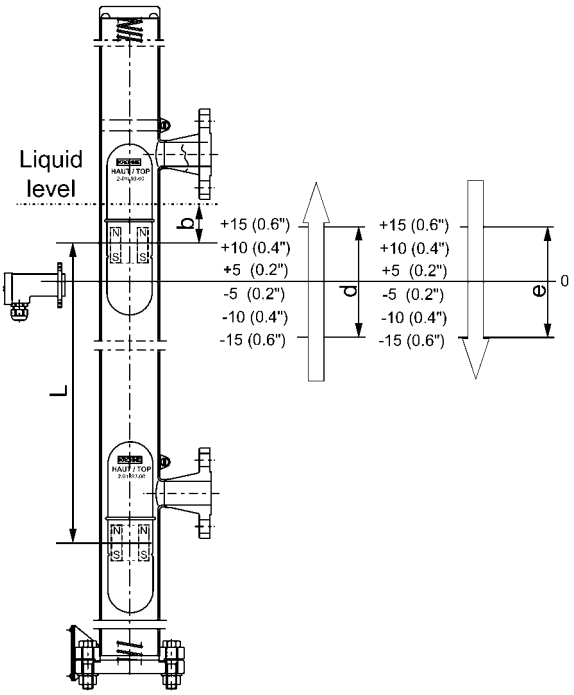
For data about switching points for the MS 40 limit switch, refer to the MS 40 Addendum for the BM 26 A Bypass Level Indicator.

3.6.2 Fine adjustments to the limit switch trigger point

Step	Action
1	Choose the true level at which the limit switch should signal “limit reached“.
2	Adjust the switch position using the procedure in Section 1.6.4 to take into account the difference between true liquid level and indicated level (magnet position). Move switch down measuring tube by “b” mm.
3	Refer to the table in section 3.6.3: “Switching point offsets“. Find the limit switch offset based on the limit switch type and the direction in which the float is moving for the switch to be triggered. Example: if the switch has to trigger when the float moves upwards then a MS 15/STD switch needs to be moved down the measuring tube by 5 mm or 0.2 ”.
4	Loosen the collar holding the limit switch onto the measuring tube.
5	Now re-position again to take into account the switch trigger points -Move the switch up or down the measuring tube by the amount required for the offset as indicated in the table and drawing in section 3.6.3.
6	Retighten the collar holding the limit switch onto the indicator tube.

3.6.3 Switching point diagram and offset values for limit switches

Item	Description
0	zero scale mark
b	difference between liquid level and scale reading due to product density
L	level indication (limit value) on the scale
d	trigger point offset of limit switch when the float goes up (distance between contact centreline and level indication or limit value - see table below)
e	trigger point offset of limit switch when the float goes down (distance between contact centreline and level indication or limit value)



Switching point offsets

	Offset due to direction of float displacement			
Limit switch	**d (Up)**		**e (Down)**	
	[mm]	[inch]	[mm]	[inch]
MS 15/STD	– 5	– 0.2	– 5	– 0.2
MS 15/EXI				
MS 15/EXD				

Dimensions in mm (inches)

4 Special versions

4.1 Low-temperature versions AG, TR or IC/TR

Version BM 26 A/AG: to -40°C or -40°F
Version BM 26 A/TR: to -200°C or -330°F
Version BM 26 A/IC/TR: to -200°C or -330°F

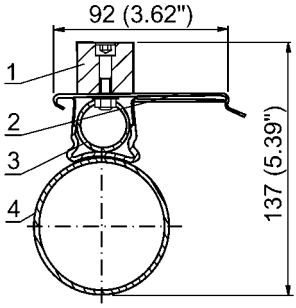
All components are made of solid CrNi steel grade 316 Ti (equivalent to 1.4571) or 316 L (equivalent to 1.4404). The measuring tube in the BM 26 A/IC/TR has glass wool insulation and aluminium cladding. The float magnets are made of a special material.

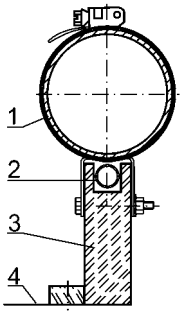
The scale indication is magnified by plexitherm glass for easier reading. The ambient temperature and product temperature will have been specified by the customer to ensure insulation is appropriate. The socket length to the connecting flange will have been specified by the customer if insulation is supplied by the customer.

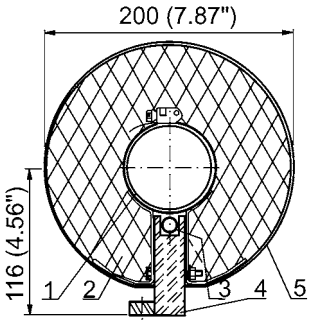
Version AG
1 Plexitherm glass
2 Indicator scale
3 Indicating tube with indicator
4 Measuring tube

Version TR
1 Measuring tube
2 Indicating tube with indicator
3 Plexitherm glass
4 Indicator scale

Version IC/TR
1 Measuring tube
2 Insulation (lagging)
3 Indicating tube with indicator
4 Plexitherm glass
5 Aluminium cladding



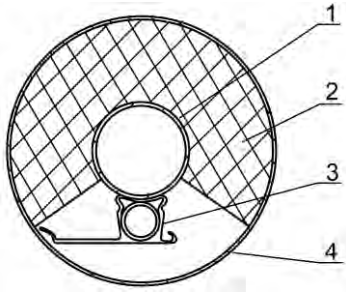




Dimensions in mm (inches)

4.2 High-temperature versions HR or IC/HR

The BM 26 A/HR and BM 26 A/IC/HR versions are suitable for applications in the range from +200°C or +390°F to +300°C or +570°F. All components are made of solid stainless CrNi steel. The measuring tube in the BM 26 A/IC/HR version has glass wool insulation and aluminium cladding.



1 Measuring tube

2 Insulation (lagging)

3 Indicating tube with indicator

4 Aluminium cladding

4.3 Heating system for measuring tube BM 26 A/B

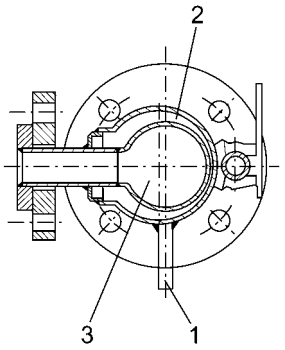
For extreme operating conditions, the measuring tube is fitted with a heating jacket with 2 standard Ermeto 12 connections, for heat transfer fluid or steam heating. See section 7.1 for more technical data.

The maximum allowable operating pressure, Pmax, of the heating medium depends on the length of the measuring chamber.

Measuring chamber length, L		**Pmax***	
[m]	**[ft]**	**[barg]**	**[psig]**
0 < L ≤ 2	0 < L ≤ 6.5	10	145
2 < L ≤ 4	6.5 < L ≤ 13	7	101.5
4 < L ≤ 6	13 < L ≤ 19.5	5	72.5

* The heating steam or cooling fluid must have a temperature in the range of -200°C to +400°C / -330°F to 750°F. Insulation of the measuring tube is recommended.

If operating conditions outside the ranges above are necessary, please contact KROHNE.



1. Heating medium inlet
2. Heating system
3. Measuring tube

4.4 Liquid/liquid interface measurement BM 26 A/TS

If a tank contains two liquids with different densities, the level of the interface can be measured by means of an adapted float loaded with ballast. The floats buoyancy properties permit it to float on the surface of the heavier liquid and ignore the lighter liquid. The difference in liquid densities must be at least 100 g/l or 6.24 lb/ft^3, with the float being fully submerged in the lighter liquid.

5 Maintenance

The instrument will not normally require any maintenance. However, flushing the instrument is recommended from time to time if the tank product is contaminated or has a tendency to form deposits. In order to do this, open the drain plug or drain valve and flush out. If the float also requires cleaning, remove it from the bottom of the measuring tube after first closing off the shut-off elements.

WARNING
Follow accident prevention regulations carefully when working with pressurized tanks and dangerous chemical products

6 Ordering spare parts

The following details are required for ordering spares:

1. Commission number of the level gauge (see instrument nameplate)
2. Instrument type, model, description, nominal size of process connections (DN)
3. Construction materials

Note: Please specify flange spacing (measuring range ie. the distance between the process connections axes) or the KROHNE Comm. No. from the initial order.

7 Technical data

7.1 Technical data: BM 26 A

Instrument type	BM 26 A
Measuring range	
Standard	0.3 … 5.5 m / 1 … 18 ft
Accuracy	± 10 mm / ± 0.4" of measured value
Min. product density	0.5 … 3.0 kg/l / 31.2 … 187 lb/ft^3
Viscosity	≤ 5000 mPa·s / 3.360 lb/ft·s
Max. allowable operating pressure at +20°C / +70°F*	40 barg / 580 psig (information on higher pressure levels available on request)
Indicator	
Standard	linear indicator with cm/m graduation
Optional	linear scale with inch/feet, % or volume graduation, as required; flap indicator without scale; flap indicator with scale in cm/m, inch/feet, % or volume graduation, as required
Mounting position	vertical
Protection (indicator) to EN 60529	IP68 (equivalent to NEMA 6)
Pressure vessel approvals	Pressure equipment directive 2014/68/EU.
Electromagnetic compatibility (EMC)	to EN 61326-1 (for more data, refer to the EU Declaration of Conformity)
Process temperature	
Standard, with flap or bar indicator	-20°C … +200°C or -4 … +390°F
AG version, with flap or bar indicator	-40°C … +200°C or -40 … +390°F
Optional, non- Ex	-200°C … +300°C / -325 … +570°F *,**
Other approvals	
ATEX	ATEX II 1/2 G or ATEX II 1 G
INERIS 02ATEX0088 X	EEx d ia IIC T3 … T6 or EEx d IIC T3 … T6 ; EEx ia IIC T3 … T6

ATEX applications: special conditions for safe use

BM 26 A Bypass Level Indicator for all options

Temperature class***	Process temperature	Ambient temperature range
T6	T(fluid) <= +70°C / +158°F	-40 … +60°C / -40 … +140°F
T5	T(fluid) <= +95°C / +203°F	-40 … +50°C / -40 … +122°F
T4	T(fluid) <= +130°C / +266°F	-40 … +50°C / -40 … +122°F
T3	T(fluid) <= +195°C / +383°F	-40 … +40°C / -40 … +104°F

* dependent on material, flange pressure rating and float pressure resistance
** higher on request
*** the temperature category of the BM 26 A depends on the options fitted to the indicator, the ambient temperature and the process temperature

Connecting flanges to EN 1092-1:	
Standard	DN25, PN40 Type B1
Option	DN15 to DN50, PN16 or PN40
to ASME B16.5:	½" to 2", 150LB/RF or 300LB/RF
for the heating jacket	
Connecting tube (standard)	For Ermeto 12 screw joint
to EN 1092-1	DN15 PN40
to ASME B16.5	½", 150LB/RF or 300LB/RF
Pipe	12 × 1 mm (0.47" × 0.04")

Information on other standards and pressure ratings supplied on request

Materials (BM 26 A without options)	Stainless steel 316 L or Ti
Level transducer (reed chain)	current output 4 … 20 mA current output 4 … 20 mA + HART output PROFIBUS PA / FF see section 7.2 for technical data on transmitter module options

7.2 Technical data: level transmitter modules

Name	PRETOP 5343B	PR 5350B	PR 5335D
Description	4-20mA. Conversion of resistance variation to analogue current signals.	PROFIBUS PA or FF. Conversion of resistance variation.	4-20mA+HART®. Conversion of resistance variation to analogue current signals. Connection of up to 15 transmitters to a digital 2-wire signal with HART communication.
Output	4 … 20 mA (limits : 3.5 & 23 mA)	PROFIBUS® PA protocol Profile A&B, ver. 3.0 (EN 50170 vol.2) or FOUNDATION™ fieldbus protocol	4 … 20 mA (limits : 3.5 & 23 mA) and HART® protocol (loop link)
Max. load R_L	$\frac{(U - 8)}{0.023}$ ohms	-	$\frac{(U - 8)}{0.023}$ ohms
Measuring error		± 10 mm	
Power supply	8 … 35 VDC 8 … 30 VDC (ATEX)	9 … 32 VDC 9 … 30 VDC (ATEX)	8 … 35 VDC 8 … 30 VDC (ATEX)
Ambient temperature	Refer to table in “ATEX applications: special conditions for safe use”, section 7.1		
Approvals Ex	EEx ia, EEx d		
Max. power dissipated by Ex d housing, P_{max}	5 W		
Max voltage for Ex d housing, U_{max}	36 V		
Max safety values for Ex i applications			
Terminal block U_i	28 V	30 V	28 V
I_i	120 mA	120 mA	120 mA
P_i	0.84 W	0.84 W	0.84 W
C_i	1 nF	2 nF	1 nF
L_i	10 µH	1 µH	10 µH

7.3 Technical data: limit switches

Limit switch	MS 15/STD	MS 15/EXI	MS 15/EXD	MS 15/*/ NAMUR
max. switching capacity LC (low power cut-out)	20 VA 1.5 A, 250 VAC	1.5 A	20 VA 1.5 A 250 VAC*****	According to NAMUR 19234
max. switching capacity HC (high power cut-out)	Max. 100 VA Min. 3 VA 1.5 A 250 VAC	—	Min. 3 VA 1.5 A 250 VAC*****	—
Ambient temperature	–20°C…+120°C –4°F…+250°F	***	***	*
Process temperature HT (high)	< +250°C < +480°F	***	***	*
Process temperature BT (low)	< +300°C < +570°F	***	***	*
Protection category to EN 60529	IP65 NEMA 4/4X	IP65 NEMA 4/4X	IP65 NEMA 4/4X	*
Cable entry PC **AL**	PG 13.5 M20 × 1.5**	PG 13.5 M20 × 1.5**	— M20 × 1.5**	*
Max. safety values	—	Ui =**** Ii =500 mA Ci =0 nF, Li =0 µH	*****	*. For Exi : Ui =24 V, Ii = ****, Ci=0 nF, Li=0 µF
Housing material BT **HT**	Polycarbonate Aluminium	Polycarbonate Aluminium	 Aluminium	*
Hysteresis	0	0	0	*
Weight PC **AL**	130 g / 0.3 lb 1200 g/ 2.6 lb	130 g / 0.3 lb 1200 g / 2.6 lb	— 1200 g / 2.6 lb	*

* For these characteristics refer to the other columns in the table above for STD (i.e. non-Ex), EXI or EXD switches – depending on which official approval has been selected.
** standard thread (cable gland not supplied). Optional: M25 × 1.5 or NPT ¾.
*** Refer to table in “ATEX applications: special conditions for safe use”, section 7.1
**** The value is not defined, however the power supply must be intrinsically-safe
***** U_{max} =380 VAC, I_{max} =1.5 A, P_{max} =20 VA

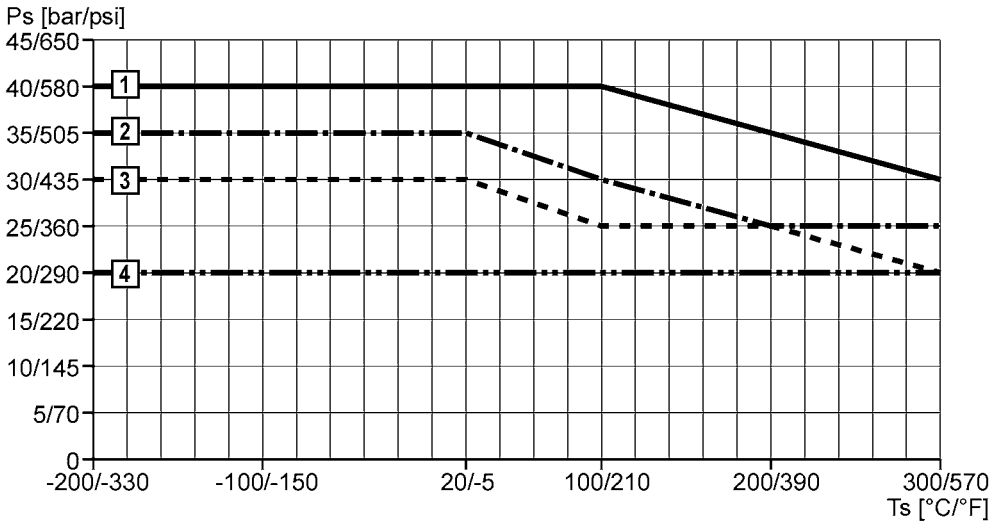
For technical data about MS 40 limit switches, refer to the MS 40 Addendum for the BM 26 A Bypass Level Indicator.

7.4 Guide tube assembly materials

Version	Flange	Gaskets	Measuring tube		
			Material	Diameter	
				[mm]	[inches]
BM 26 A	316Ti (1.4571) 316L (1.4404)	aramide (PTFE optional)	316Ti (1.4571) 316L (1.4404)	72 × 2.3	2.83 × 0.091

7.4.1 Maximum operating conditions for BM 26 A with 316Ti steel measuring tube according to European Union Pressure Equipment Directive 2014/68/EU

The graph below shows the maximum allowable process pressure, Ps, for a given process temperature, Ts, in a 316Ti measuring chamber of a given nominal diameter (the flanges being grouped into 4 categories).



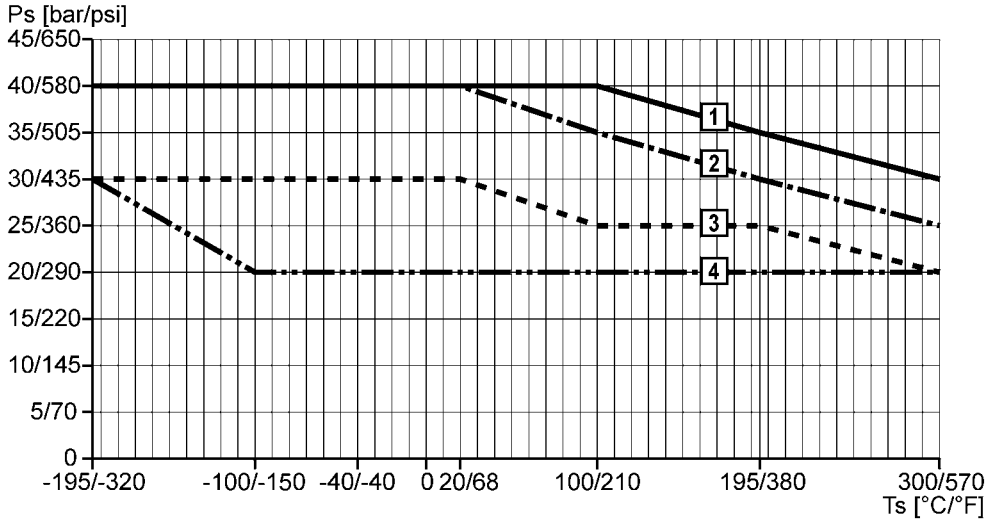
Higher operating pressures may be approved by KROHNE following analysis of customer specifications. Maximum product temperature is dependent on the application and is defined by the customer in the product order options list.

7.4.2 Flange categories for operating conditions in a 316Ti steel measuring tube

Flange Categories			
1	2	3	4
DN15 PN40 DN20 PN40 DN25 PN40 DN15 PN40 WN DN20 PN40 WN DN25 PN40 WN ½ " ASME 300LB ¾ " ASME 300LB 1" ASME 300LB 1"½ ASME 300LB	DN50 PN40 DN50 PN40 WN 2" ASME 300LB	DN40 PN40 DN40 PN40 WN	½ " ASME 150LB ¾ " ASME 150LB 1" ASME 150LB 1"½ ASME 150LB 2" ASME 150LB

7.4.3 Maximum operating conditions for BM 26 A with 316 L steel measuring tube according to European Union Pressure Equipment Directive 2014/68/EU

The graph below shows the maximum allowable process pressure, Ps, for a given process temperature, Ts, in a 316L measuring chamber of a given nominal diameter (the flanges being grouped into 4 categories)



Higher operating pressures may be approved by KROHNE following analysis of customer specifications. Maximum product temperature is dependent on the application and is defined by the customer in the product order options list.

7.4.4 Flange categories for operating conditions in a 316L steel measuring tube

Flange Categories			
1	**2**	**3**	**4**
DN15 PN40	DN25 PN40	DN40 PN40	½ " ASME 150LB
DN20 PN40	DN25 PN40 WN	DN40 PN40 WN	¾ " ASME 150LB
DN15 PN40 WN	1" ASME 300LB	DN50 PN40	1" ASME 150LB
DN20 PN40 WN		DN50 PN40 WN	1"½ ASME 150LB
½ " ASME 300LB		1"½ ASME 300LB	2" ASME 150LB
¾ " ASME 300LB		2" ASME 300LB	

7.5 BM 26 A weights and dimensions

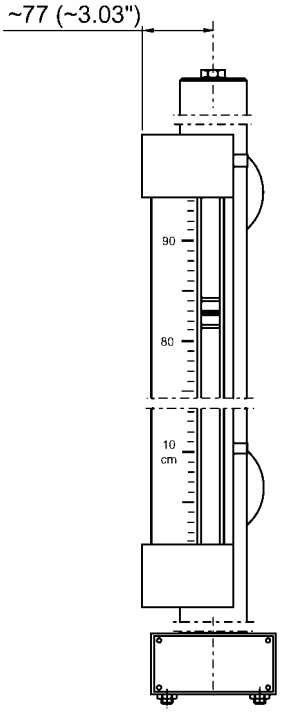
7.5.1 Weights

For units with 1 m or 3.28 ft flange spacing. The weight for every additional 100 mm or 3.94'' between flanges is given in brackets.

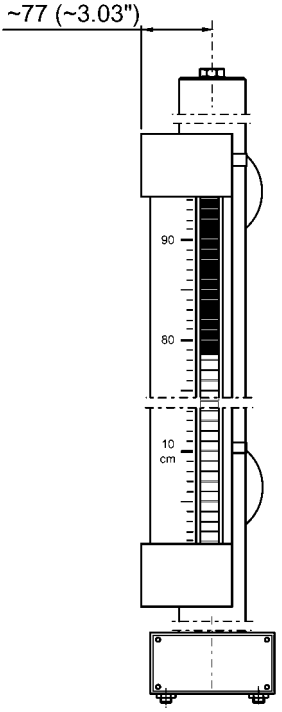
Version	Weight in	
	[kg]	[lb]
BM 26 A/STD	14.5 (+0.51)	31.96 (+1.12)
BM 26 A/EXD	20.6 (+0.82)	45.50 (+1.81)

7.5.2 Indicator dimensions

BM 26 A with standard bar indicator



BM 26 A with optional flap indicator



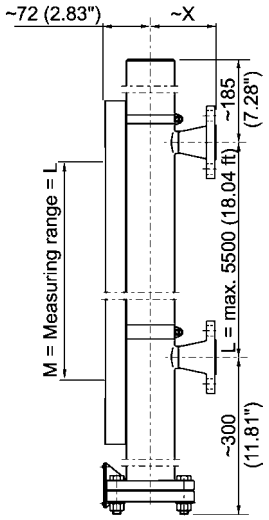
Dimensions in mm and (inches)

7.5.3 Overall dimensions of measuring tube classes (with loose or welding neck flanges)

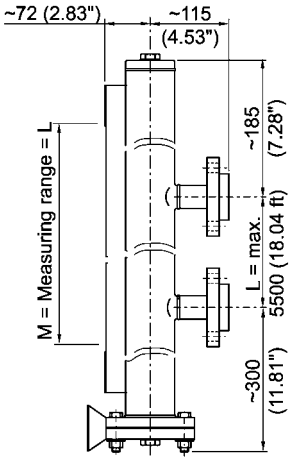
The BM 26 A is divided into four different classes that define the positions of the process connections.

BM 26 A measuring tube class	Description
BM 26 A/C	Equipped with two lateral connections
BM 26 A/D	Equipped with two axial connections
BM 26 A/E	Equipped with one lateral entry and one bottom axial exit connection
BM 26 A/F	Equipped with one lateral entry and one top axial exit connection

BM 26 A/C/RR
Welding neck (WN) flange

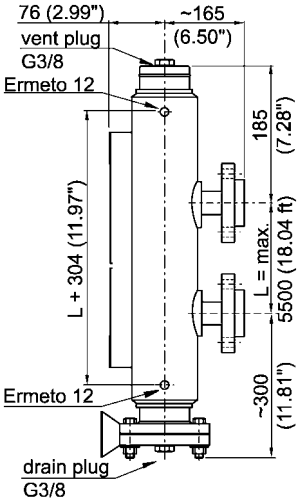


BM 26 A/C/RR
Loose (EN) flange



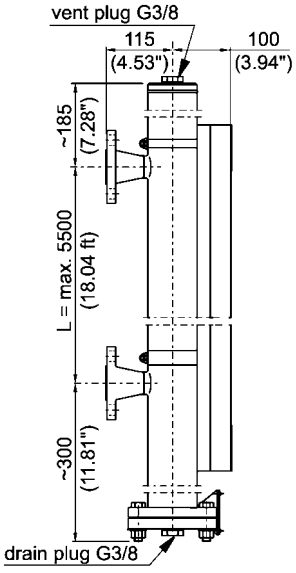
BM 26 A/C/B

(heater sub-type C)
Loose (EN) flange

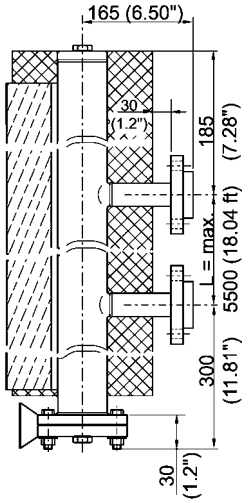


BM 26 A/C/AG

(anti-freeze sub-type C)
Welding neck (WN) flange

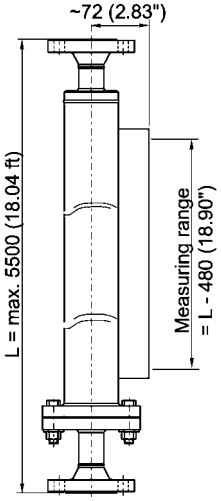


BM 26 A/C/IC/TR or /HR
(lagged)
TR low, HR high temp.
Loose (EN) flange

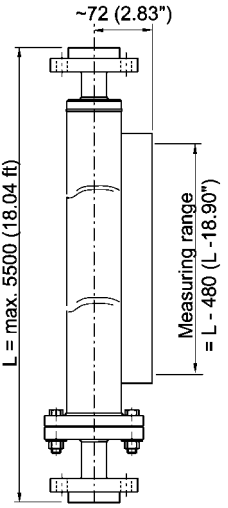


The dimensions are given in mm (inches).

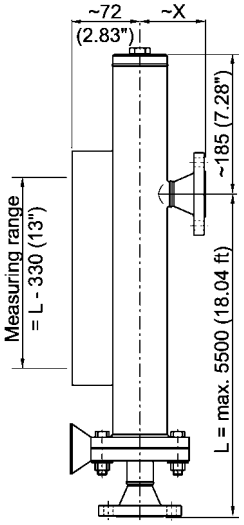
BM 26 A/D/RR
Welding neck (WN) flange



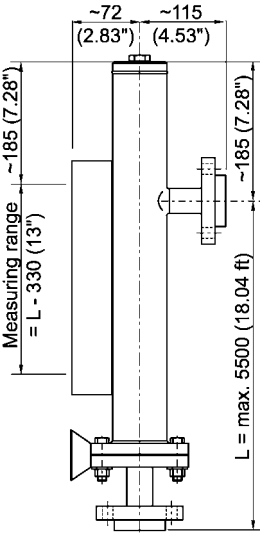
BM 26 A/D/RR
Loose (EN) flange



BM 26 A/E/RR
Welding neck (WN) flange

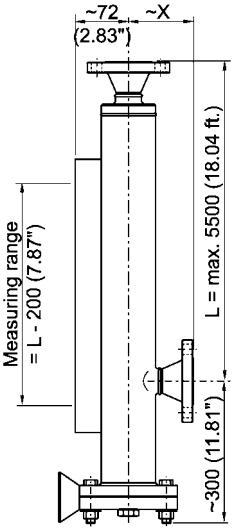


BM 26 A/E/RR
Loose (EN) flange

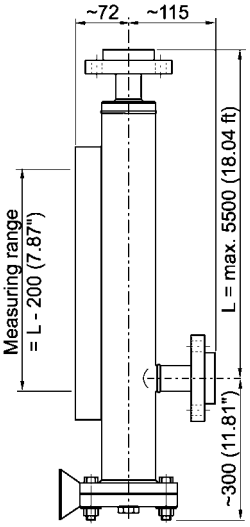


The dimensions are given in mm (inches).

BM 26 A/F/RR
Welding neck (WN) flange



BM 26 A/F/RR
Loose (EN) flange



The dimensions are given in mm (inches).

7.5.4 Distance of welding neck flange raised facing from measuring tube axis

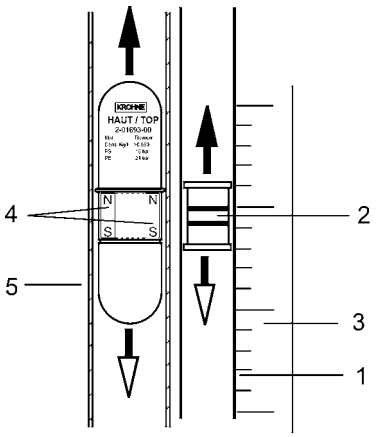
Refer to the diagrams in section 7.5.3

Flange, process connection ratings	X, BM 26 A tube axis to flange raised facing	
	[mm]	[inch]
DN15 PN40, welding neck flange	79.5	3.13
DN20 PN40, welding neck flange	81.5	3.21
DN25 PN40, welding neck flange	81.5	3.21
DN40 PN40, welding neck flange	86.5	3.41
DN50 PN40, welding neck flange	89.5	3.52
½" ASME 150LB, welding neck flange	89.5	3.52
1" ASME 150LB, welding neck flange	97.5	3.84
1"½ ASME 150LB, welding neck flange	103.5	4.07
2" ASME 150LB, welding neck flange	104.5	4.11
¾" ASME 150LB, welding neck flange	93.5	3.68
½" ASME 300LB, welding neck flange	93.5	3.68
¾" ASME 300LB, welding neck flange	98.5	3.88
1" ASME 300LB, welding neck flange	103.5	4.07
1"½ ASME 300LB, welding neck flange	109.5	4.31
2" ASME 300LB, welding neck flange	111.5	4.39

8 Measuring principle

The instrument operates on the principle of communicating tubes. The measuring tube is connected as adjacent to the tank (i.e. a bypass chamber) such that the same conditions are obtained in the tube as those in the tank.
The float is equipped with a number of permanent magnets to transmit measured values to the local indicator. Two methods of local indication are used:

Standard bar indicator
The indicator tube contains a magnetised indicator bar that follows changes in floater position.



1 Indicator tube

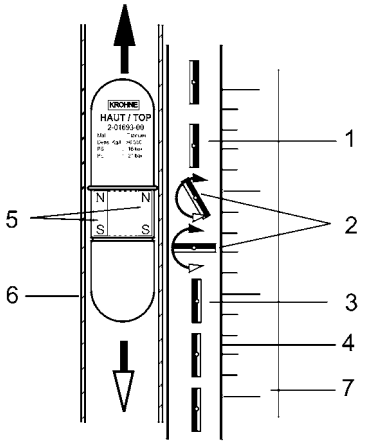
2 Bar (float-following indicator)

3 Measuring scale

4 Magnets set inside the float

5 Measuring tube

Optional flap indicator
The magnet mounted in the float activates (rotates) the magnetic flaps according to the liquid level in the indicating section of the indicator. The column of reversed yellow magnetic flaps, or the vertical position of the follower magnet, is the indication of the liquid level. Additionally, the liquid level can be read off from a large-size scale in various units of length or graduations showing percentages or volumes.



1 Black front face of flap indicator

2 Flap rotates as magnet in float moves past this point

3 Yellow reverse face of flap indicator

4 Flap indicator tube

5 Magnets set inside the float

6 Measuring tube

7 Measuring scale

Remote indication is possible by choosing the level transducer and level switch options. Information on their working principles and characteristics are given in sections 2 and 3 respectively.

Notes

Notes

If you need to return level gauges for testing or repair to KROHNE

If installed and operated in accordance with these operating instructions, your level gauges will rarely present any problems.
Should you nevertheless need to return a BM 26 A unit for checkout or repair, please pay strict attention to the following points:
Due to statutory regulations concerning protection of the environment and the health and safety of our personnel, KROHNE may only handle, test and repair returned level gauges that have been in contact with liquids if it is possible to do so without risk to personnel and environment. This means that KROHNE can only service your unit if it is accompanied by a certificate in line with the following model confirming that the level gauge is safe to handle.

If the unit has been operated with toxic, caustic, flammable or water-endangering liquids, you are kindly requested

- to check and ensure, if necessary by rinsing or neutralizing, that all cavities are free from such dangerous substances.
  (Directions on how you can find out whether the unit has to be opened and then flushed out or neutralized are obtainable from KROHNE on request.)
- to enclose a certificate with the level gauge confirming that it is safe to handle and stating the liquid used.

KROHNE regret that they cannot service your level gauge unless accompanied by such a certificate.

Specimen certificate

Company: _____ Address: _____

Department: _____ Name: _____

Tel. No.: _____

The enclosed liquid level gauge

Type: _____

KROHNE Order No. or Series No.: _____

has been operated with the following liquid: _____

Because this liquid is

- ☐ water-endangering
- ☐ toxic
- ☐ caustic
- ☐ flammable

we have

- ☐ checked that all cavities in the unit are free from such substances
- ☐ flushed out and neutralized all cavities in the unit

We confirm that there is no risk to man or environment through any residual liquid contained in this level gauge.

Date: _____ Signature: _____

Company stamp: